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***Tiporus emmae* nov.sp. from Northern Australia (Coleoptera: Dytiscidae, Hydroporinae)**

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A b s t r a c t : *Tiporus emmae* nov.sp. is described from the Kimberley Plateau in Western Australia and the Mary River region in the Northern Territory in Australia. The new species is similar in size and colour to *Tiporus centralis* (WATTS 1978), *T. denticulatus* (WATTS 1978), *T. georginae* WATTS 2000 and *T. josepheni* (WATTS 1978) from northern Australia but well characterized by its more broadly-oval habitus, form of median lobe, and last abdominal segment of male having two small knobs at tip. *Tiporus emmae* nov.sp. is a lotic species being collected from rest pools of intermittent creeks and rivers with sandy bottom. Important species characters (habitus, median lobe, paramere, apical abdominal segment and protibia of male) are illustrated, and the habitat of *T. emmae* nov.sp. and its water beetle coenosis are briefly outlined. Faunistic records of 29 Dytiscidae including the rarely collected *T. georginae* are provided. The total number of described species in the genus *Tiporus* is now 12.

K e y w o r d s : *Tiporus*, Dytiscidae, new species, Western Australia, Northern Territory.

Introduction

The diving beetle genus *Tiporus* WATTS 1985 is an Australian faunal element, with 11 species distributed across coastal northern and north-western Australia (LAWRENCE et al. 1987, NILSSON 2001), and one undescribed species from New Caledonia (HENDRICH et al. in preparation). They appear to be restricted to slow flowing rivers and streams and their backwaters, or to pools and puddles which form in their beds in the dry season. In these habitats up to five species of the genus are often abundant and aggregations of several hundred specimens are not unusual. The genus was last revised by WATTS (2000), who provided a key for all the species then known.

In June 1999 and August 2006 predaceous water beetles and their larvae were collected in different parts of the Kimberley Plateau in north-western Australia and in the Mary River region of the Northern Territory. Many streams and river systems of the area, especially outside the National Parks were not well investigated previously for water beetles, and therefore the study has provided some undescribed species and a number of interesting and new regional records (HENDRICH 2003, HENDRICH & WANG 2006, HENDRICH & WATTS 2004, 2007). The aim of this paper is to describe a very distinct species of *Tiporus*, and to provide notes on the habitat of the species. The total number of described species in the genus *Tiporus* is now 12.

Material and Methods

The digital habitus photos were produced by Dr. U. Schmidt (Selbitz, Germany). The beetles were studied with a Leica MZ 9.5 binocular at 10-60x. Drawings of the male genitalia were made by using digital images.

The following abbreviations are used in the text: NT (Northern Territory), QLD (Queensland), WA (Western Australia, TL (total length), TL-H (total length without head), and MW (maximum width).

The terminology to denote the orientation of the genitalia follows MILLER & NILSSON (2003). Label data of the type material are cited in quotation marks and the style of the descriptive notes follows WATTS (1978, 2000).

Specimens mentioned in this work are deposited in several collections which are abbreviated in the text as follows:

ANIC	Australian National Insect Collection, Canberra, Australia
CGW	Collection Prof. Dr. Günther Wewalka, Vienna, Austria
CHF	Collection Dr. Hans Fery, Berlin, Germany, property of NMW
CLH	Collection Dr. Lars Hendrich, Berlin, Germany, property of NMW
NMW	Naturhistorisches Museum Wien, Vienna, Austria
NTM	Museum and Art Gallery, Darwin, Northern Territory, Australia
OLML	Oberösterreichische Landesmuseen Linz, Austria
SAMA	South Australian Museum, Adelaide, South Australia, Australia
ZSM	Zoologische Staatssammlung München, Munich, Germany

Checklist and distribution of the genus *Tiporus* WATTS 1985

<i>T. alastairi</i> (WATTS 1978)	WA, Pilbara and Kimberley region
<i>T. centralis</i> (WATTS 1978)	Northern Australia (WA, NT)
<i>T. collaris</i> (HOPE 1842)	Northern Australia (WA, NT)
<i>T. denticulatus</i> (WATTS 1978)	Northern Australia (NT, QLD)
<i>T. emmae</i> nov.sp.	Northern Australia (WA, NT)
<i>T. georginae</i> WATTS 2000	WA, Kimberley region
<i>T. guiliani</i> (WATTS 1978)	Northern Australia (WA, NT)
<i>T. josepheni</i> (WATTS 1978)	Northern Australia (WA, NT, QLD)
<i>T. lachlani</i> WATTS 2000	WA, Pilbara
<i>T. moriartyensis</i> WATTS 2000	NT, Moriarty Creek near Keep River
<i>T. tambreyi</i> (WATTS 1978)	WA, Pilbara
<i>T. undecimmaculatus</i> (CLARK 1862)	Northern Australia (WA, NT, QLD)

Genus *Tiporus* WATTS 1985

Small (3.3-5.0 mm), oval and black beetles, some with reddish markings on elytra and pronotum, which belong to the tribe Hydroporini. From the related genera *Antiporus* SHARP 1882 and *Sekaliporus* WATTS 1997 it can be distinguished by the form of the humeral angle of the elytron and the 3-segmented male protarsi. For a detailed generic analysis see WATTS (1997, 2000).

***Tiporus emmae* nov.sp. (Figs 1-6)**

Type locality: Australia, Northern Territory, Mary River, Bowerbird Creek, rest pool. Type material: Holotype 1♂: "Australia: NT, Kakadu Hwy, Bowerbird Creek, 5 km W Mary River Roadh., large pool, 20m, 24.VIII.2006, 13.38.142S 132.10.345E, L. & E. Hendrich leg. (NT 15b)" (SAMA). Paratypes: 480 exs.: 454 specimens with same label data as holotype (ANIC, CGW, CHF, CLH, NMW, NTM, OLML, SAMA, ZSM); 1 ex.: "Australia: NT, Kakadu Hwy, Harriet Creek at Hwy Cross., 153m, 24.VIII.2006, 13.44.512S 131.54.012E, L. & E. Hendrich leg. (NT 14)" (CLH); 15 exs.: "AUSTRALIA/WA/Shire of Wyndham - East Kimberley, Gibb Range, Gibb River Road, Russ Creek Crossing, 380 m, 14.6.1999, Hendrich leg./coll. Loc. 8/108" (CLH); 5 exs.: "AUSTRALIA/WA/East Kimberley, East Gibb River Road, Barnett River Gorge, 450m, 19.6.1999, Hendrich leg./coll. Loc. 17/117" (CLH); 2 exs.: "AUSTRALIA/WA/East Kimberley, Gibb River Road, Saddler Spring, 350m, 22.6.1999, Hendrich leg./coll. Loc. 20/120" (CLH); 2 exs.: "AUSTRALIA/WA/Shire of Halls Creek, Purnululu N.P., Cathedral Gorge, Piccaninny Creek, 200 m, 28.6.1999, Hendrich leg./coll. Loc. 29a/129a" (CLH); 1 ex.: "AUSTRALIA/WA/East Kimberley, N.N. Creek 40 km W Kununurra, 50 m, 29.6.1999, Hendrich leg./coll. Loc. 30/130" (CLH). All paratypes are provided with a red printed paratype label.

Additional material examined:

***Tiporus centralis* (WATTS 1978): Northern Territory:** 1 ex.: Kakadu Hwy, Harriet Creek at Hwy Cross., 153 m, 24.VIII.2006, 13.44.512S 131.54.012E, L. & E. Hendrich leg. (NT 14) (ZSM); 60 exs.: Kakadu Hwy, Bowerbird Creek, 5 km W Mary River Roadh., large pool, 20 m, 24.VIII.2006, 13.38.142S 132.10.345E, L. & E. Hendrich leg. (NT 15b) (CLH, ZSM); 63 exs.: Kakadu N.P., Nourlangie District, Gubara, 50 m, 25.X.1996, 12.50.101S 132.52.501E, L. Hendrich leg. (Loc. 1) (CLH); 100 exs.: Kakadu N.P., Jim Jim District, Jim Jim Falls Camping Area, Jim Jim Creek, 60 m, 26. & 27.X.1996, 13.16.218S 132.49.276E, L. Hendrich leg. (Loc. 2) (CLH); 6 exs.: Kakadu N.P., Jim Jim District, Barramundie Gorge, Maguk, 50 m, 31.X.1996, 13.18.823S 132.26.198E, L. Hendrich leg. (Loc. 10) (CLH); 24 exs.: Kakadu N.P., Jim Jim District, Gungrul Lookout, 50 m, 1.XI.1996, 13.59.359S 132.19.904E, L. Hendrich leg. (Loc. 11) (CLH); 38 exs.: Kakadu N.P., Mary River District, Gunlom Waterfall Creek, 150 m, 2.XI.1996, 13.26.082S 132.24.929E, L. Hendrich leg. (Loc. 13) (CLH); 69 exs.: Kakadu N.P., Mary River District, 3 km ESE Gunlom Camping Area, South Alligator River, 50 m, 2.XI.1996, 13.27.276S 132.26.268E, L. Hendrich leg. (Loc. 14) (CLH).

***Tiporus denticulatus* (WATTS 1978): Queensland:** 1 ex.: N Queensland, 10 km WSW Petford, at light, 23.I.1988, R.I. Storey leg. (CLH); 1 ex.: Pond at Mclead River, 4.XII.1997, G. Challet leg. (CLH); 3 exs.: Greenvale, 150 km NW Charters Towers, 19.I.1993, G. Wewalka leg. (QL 12-14) (CGW, CLH).

***Tiporus georginae* WATTS 2000: Western Australia:** 12 exs.: East Kimberley, Gibb River Road, Saddler Spring, 350 m, 22.VI.1999, L. Hendrich leg./coll. Loc. 20/120 (CLH, ZSM). This is the first record of the species since its description based on specimens collected near Kalumburu in the northern Kimberley region.

***Tiporus josepheni* (WATTS 1978): Northern Territory:** 2 exs.: Finnis River, 10 km W Batchelor, 43 m, 20.VIII.2006, 13.01.278S 130.57.217E, L. & E. Hendrich leg. (NT 2) (ZSM, CLH); 30 exs.: Magela Creek upstream, Jabiru East, 38 m, 29.VIII.2006, 12.40.458S 132.55.853E, L. & E. Hendrich leg. (NT 21) (ZSM, CLH); 25 exs.: Magela Creek downstream, Jabiru East, 31m, 30.VIII.2006, 12.38.312S 132.53.441E, L. & E. Hendrich leg. (NT 23) (ZSM, CLH); 15 exs.: Gulungul Creek at Hwy Cross., Jabiru - Jabiru East, 31 m, 30.VIII.2006, 12.39.327S 132.52.716E, L. & E. Hendrich leg. (NT 24) (ZSM, CLH); 1 ex.: Melville Island, Pularumpi, 11.24 S 130.25 E, 30.VI.-6.VII.1986, M.V.Light, P. Horner leg. Operation Raleigh 1986 (NTM); 1 ex.: Tributary of the Reynolds River, 15 km SE of Wangi, 18.XII.1979, M. Malipatil leg. (NTM); 101 exs.: Kakadu N.P., Jim Jim District, Jim Jim Falls Camping Area, Jim Jim Creek, 60 m, 26. & 27.X.1996, 13.16.218S 132.49.276E, L. Hendrich leg. (loc. 2a) (CLH); 1 ex.: Kakadu N.P., Nourlangie District, Arnhem Highway, 25 km WNW Jabiru, 30 m, 29.X.1996, 12.46.528S 132.16.203E, L. Hendrich leg. (loc. 6) (CLH); 156 exs.: Kakadu N.P., Jim Jim District, Gungrul Lookout, 50 m, 1.XI.1996, 13.59.359S 132.19.904E, L. Hendrich leg. (loc. 11) (CLH); 1 ex.: Kakadu N.P., Mary River District, 3 km ESE Gunlom Camping Area, South Alligator River, 50 m, 2.XI.1996, 13.27.276S 132.26.268E, L. Hendrich leg. (Loc. 14) (CLH). **Queensland:** 3 exs.: Australia: 20 km NE Mareeba, Hodzic Road, 361 m, 12.IX.2006, 16.49.556S 145.27.211E, L. & E. Hendrich leg. (QLD 28) (ZSM, CLH).

Description: A large, blackish and broadly-oval species, widest in middle, with reddish markings on elytra and pronotum (Figs 1, 2).

Measurements. TL: 3.9-4.0 mm (holotype 3.9 mm); TL-H: 3.5-3.6 mm (holotype 3.5 mm); MW: 2.2-2.25 mm (holotype 2.2 mm); TL/MW: 1.77-1.78.

Colour. Head black, sides, base and portions of middle of pronotum reddish. Elytron with eight vague red patches dorsally and laterally. Ventral surface dark reddish-brown. Epipleuron, prosternum and legs mainly rufopiceous; metatibia and -tarsus dark rufopiceous. Appendages rufopiceous, apical segments of male protarsus darkened.

Sculpture. Disc of pronotum smooth, without lateral ridges or grooves. Side of elytron curves forward immediately before meeting edge of pronotum, very weakly serrate towards tip. Reticulate and strongly and densely rugose-punctate throughout but punctures on dorsal surface shallow. Prothoracic process relatively narrow, ridged in midline, apex rounded, midline virtually impunctate. Metacoxal lines well separated, moderately diverging posteriorly and in middle, rapidly diverging in anterior quarter, not reaching metasternum.

Male. Protarsus three-segmented, anterior sides of segments of protarsus strongly expanded. Mesotarsus a little expanded. Single claw of protarsus short and evenly curved towards apex. Mesotrochanter with well developed and dense line of golden setae. Pro- and mesotarsi moderately expanded, 2nd segment about as wide as long. Protibia with small tooth on outside near base (Fig. 1). Tip of apical abdominal segment with two well developed knobs (Fig. 6). Metatibia normal, not expanded. Median lobe of aedeagus broad in centre but narrow at tip (Figs 3, 4), right paramere (Fig. 5).

Female. Protarsus five-segmented, robust somewhat expanded on inside. Protibia without tooth on outside. Tip of apical sternite flattened. Lateral extension to elytron near tip weak.

E t y m o l o g y : Dedicated to my wife Emma Hendrich for her steady support, engagement and patience during the six months' journey across Australia.

D i s t r i b u t i o n : Kimberley region in Western Australia and Mary River region in the Northern Territory (Fig. 7).

Habitat: A lotic species. Most specimens were collected in a large (30 m², 1 m depth), isolated and partly shaded pool, without any submerged and emerged vegetation, of the intermittent Bowerbird Creek. The bottom of the pool consisted of sand and gravel with a thin layer of rotten plants. The single specimen from Harriet Creek was obtained from a small rest pool (8 m², 50 depth) with sandy bottom and very gloomy water, of the almost dry riverbed, shaded by some larger rocks. Both creeks are fringed by a mixed *Melaleuca viridiiflora* and *M. leucadendra* forest (Figs 8, 9) and belong to the same river system which drained into the Mary River.

In the Kimberley region the species was obtained from the following sites: Locality 8/108: Russ Creek is a slow flowing, semi-shaded and shallow stream with sandy bottom, covered with a layer of rotten leaves (Fig. 12). Locality 17/117: Small (1-3 m), shallow (25 cm) and slow flowing stream in the Barnett Gorge, partly shaded by mixed *Pandanus* forest and grass tussocks. The bottom consisted of rocks with a layer of rotten leaves and grasses (Fig. 11). Locality 20/120: Almost standing, exposed and deep stream with dark water. The river bank was covered with stands of large Cyperaceae. All beetles were obtained from a shallow (20-30 cm) backwater of 3 m², among roots of emergent

vegetation and plant debris. Locality 29a/129a: Small, open rest pool of the intermittent Piccaninny Creek. The bottom consisted of bare rock, stones and pebbles, without any vegetation. All beetles were crawling in very shallow water (2-4 cm) among the stones (Fig. 10). Locality 30/130: Large (15-20 m²), shallow (up to 50 cm) and semi-shaded pool without any vegetation of an almost dry and nameless creek, which was partly shaded by a concrete bridge. The bottom consisted of stones, sand and clay, with a thin layer of rotten leaves (Fig. 13). The rich predaceous water beetle coenosis of all sampled sites is listed in table 1.

D i f f e r e n t i a l d i a g n o s i s : A distinct species. The only taxa which could possibly be confused with the new species are: *T. centralis*, *T. denticulatus*, *T. georginae* and *T. josepheni*. But *T. emmae* nov.sp. is more broadly-oval than *T. centralis* (TL: 3.3-3.85 mm, MW: 1.8-1.9 mm, TL/MW: 1.83-2.02), *T. denticulatus* (TL: 3.4-3.6 mm, MW: 1.9-1.95 mm, TL/MW: 1.78-1.85), and most *T. georginae* (TL: 3.75-3.9 mm, MW: 2.0-2.05 mm, TL/MW: 1.83-1.90) and *T. josepheni* (TL: 3.75-3.9 mm, MW: 2.0-2.1 mm, TL/MW: 1.86-1.88). From the latter it can be distinguished by the male having the spine of protibia near base (*T. josepheni* on outside near middle) and by the female elytron of *T. josepheni* which shows a larger and well developed triangular extension reaching beyond tip.

From all species of the genus *T. emmae* nov.sp. can easily be separated by its male apical abdominal segment which has two well developed knobs at tip, and the mesotrochanter showing a dense row of golden setae. Furthermore, the form of the median lobe clearly distinguished *T. emmae* nov.sp. from all other species of the genus (see WATTS 1978, 2000).

Modified key to the species of *Tiporus* after WATTS (2000)

- 6 Pronotum weakly ridges at sides; edge of elytra straight immediately prior to it meeting pronotum; Body more parallel sided. Male proclaw short, thickened basally. Tip of male apical sternite with a weak ridge in midline. Mesotrochanter of male with few setae; TL: 3.4-3.6 mm *T. denticulatus*
- Pronotum smooth; body oval, edge of elytra slightly curved immediately prior to it meeting pronotum; male proclaw elongate, thin. Tip of male apical sternite broadly grooved in midline. Mesotrochanter of male with few setae; TL: 3.3-3.85 mm. *T. centralis*
- *- Body broadly oval, widest in middle; male proclaw short and evenly curved towards apex. Tip of male apical abdominal segment with two well developed knobs. Mesotrochanter of male with dense line of golden setae; TL: 3.9-4.0 mm..... *T. emmae* nov.sp.

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Zusammenfassung

Der auf dem Kimberley Plateau und in der Region des Mary River im Norden Australiens vorkommende Schwimmkäfer *Tiporus emmae* nov.sp. wird beschrieben. Die Art steht in Form und Farbe den Taxa *Tiporus centralis* (WATTS 1978), *T. denticulatus* (WATTS 1978), *T. georginae* WATTS 2000 and *T. josepheni* (WATTS 1978) sehr nahe, unterscheidet sich aber von diesen im Bau des Medianlobus und letzten Abdominalsegments sowie in der Ausbildung der männlichen Vorderschienen. *Tiporus emmae* nov.sp. ist ein Bewohner von langsam fließenden Gewässern und Resttümppeln kleinerer Bäche und Flüsse. Bemerkenswerte faunistische Meldungen von weiteren 29 Schwimmkäferarten werden gemacht.

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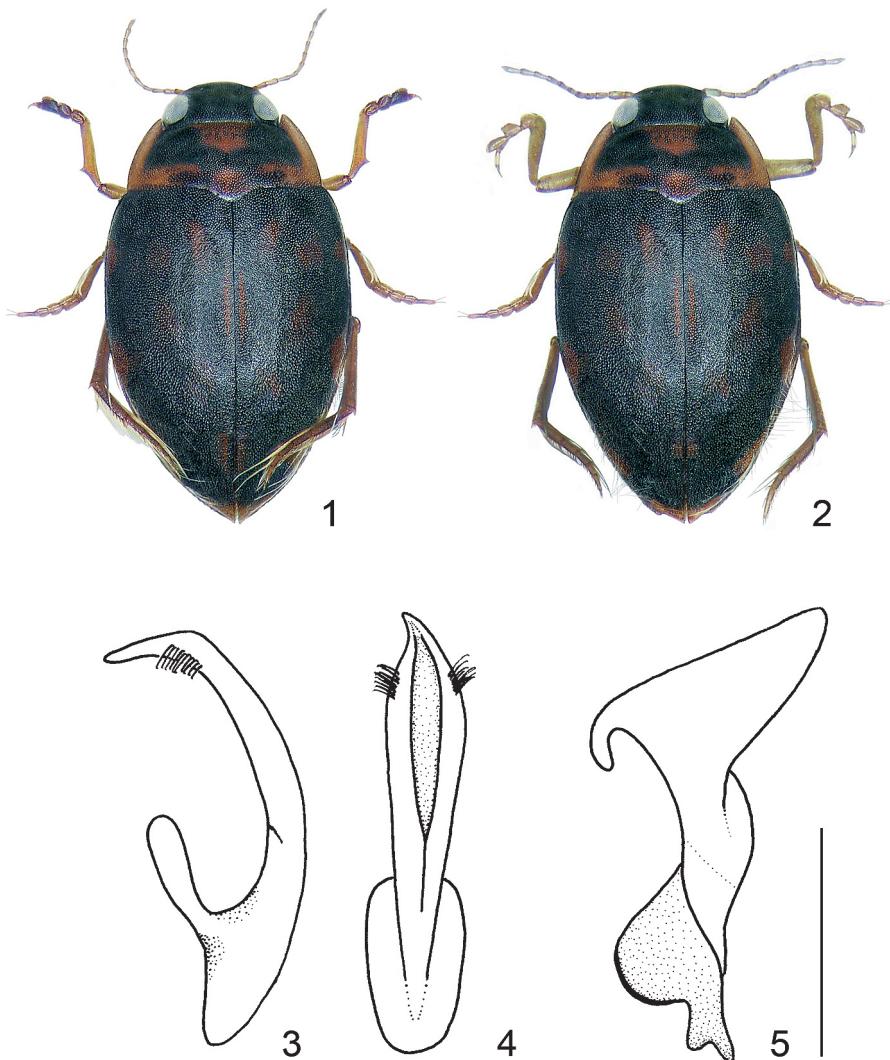
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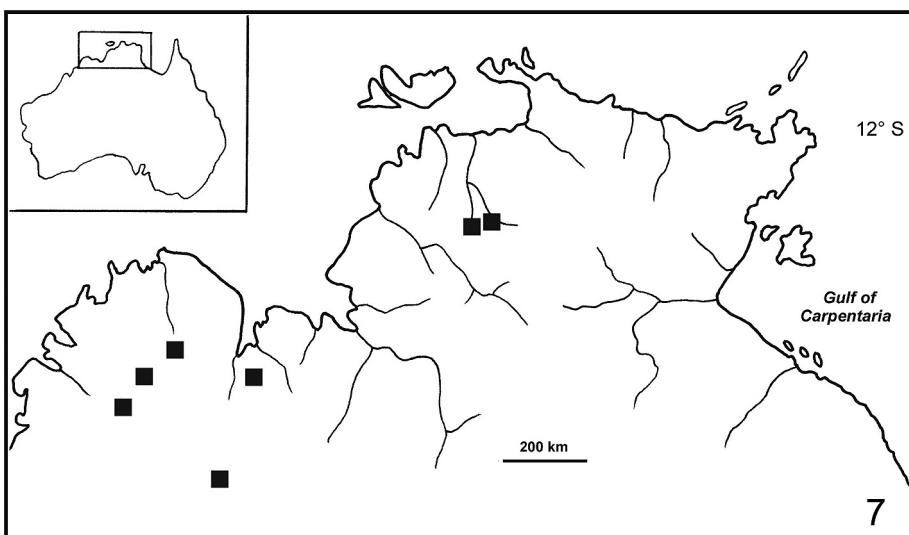
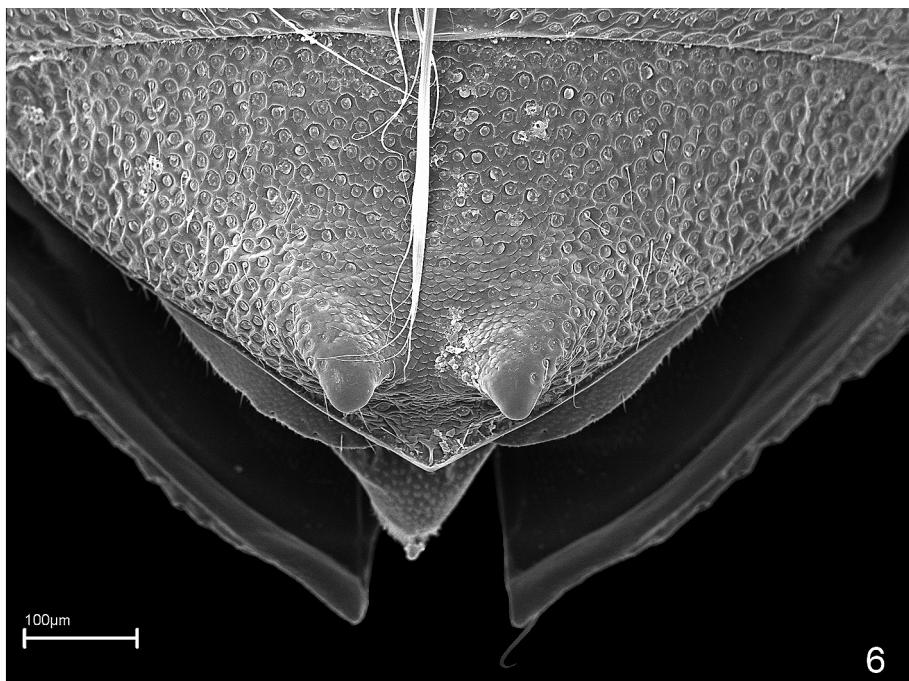
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Table 1: Predaceous water beetles collected at all mentioned sampling sites.

Species	NT 14	NT 15b	8/ 108	17/ 117	20/ 120	29a/ 129a	30/ 130
<i>Antiporus jenniferae</i> WATTS 1997		•					
<i>Bidessodes grossus</i> (ZIMMERMANN 1921)	•	•					
<i>Bidessodes flavosignatus</i> (ZIMMERMANN 1921)		•	•				•
<i>Bidessodes mjobergi</i> (ZIMMERMANN 1921)	•	•	•	•	•	•	
<i>Bidessodes</i> sp.		•	•	•	•	•	•
<i>Clypeodytes larsoni</i> HENDRICH & WANG 2006	•	•					
<i>Copelatus nigrolineatus</i> SHARP 1882		•		•	•		
<i>Hydroglyphus basalis</i> (MACLEAY 1871)		•					
<i>Hydroglyphus daemeli</i> (SHARP 1882)	•			•		•	
<i>Hydroglyphus godeffroyi</i> (SHARP 1882)	•	•	•		•		
<i>Hydroglyphus grammopterus</i> (ZIMMERMANN 1928)	•						
<i>Hyphydrus contiguus</i> WEHNCKE 1877	•		•				
<i>Hyphydrus lyratus</i> SWARTZ 1808	•	•		•		•	
<i>Laccophilus cingulatus</i> SHARP 1882	•		•	•	•		
<i>Laccophilus clarki</i> SHARP 1882			•	•	•		•
<i>Laccophilus sharpi</i> RÉGIMBART 1889	•		•				
<i>Laccophilus walkeri</i> BALFOUR-BROWNE 1939	•						
<i>Limnephilus compactus</i> (CLARK 1862)	•			•			
<i>Necterosoma regulare</i> SHARP 1882				•	•		
<i>Necterosoma theonathani</i> HENDRICH 2003				•	•		
<i>Paraclypeus migrator</i> (SHARP 1882)				•			•
<i>Sekaliporus kriegi</i> WATTS 1997		•					
<i>Sternopriscus alligatorensis</i> HENDRICH & WATTS 2004	•		•				
<i>Sternopriscus aquilonaris</i> HENDRICH & WATTS 2004	•	•					•
<i>Tiporus centralis</i> (WATTS 1978)	•	•		•	•		•
<i>Tiporus emmae</i> nov.sp.	•	•	•	•	•	•	•
<i>Tiporus georginae</i> WATTS 2000					•		
<i>Tiporus guiliani</i> (WATTS 1978)	•	•		•			•
<i>Tiporus josepheni</i> (WATTS 1978)			•				•
<i>Tiporus undecimmaculatus</i> (CLARK 1862)	•	•	•	•	•	•	•



Figs 1-5: *Tiporus emmae* nov.sp., (1) male (3.9 mm) and (2) female (4.0 mm), (3) median lobe (lateral view), (4) median lobe (ventral view), (5) right paramere (lateral view), scale 0.4 mm.



Figs 6-7: (6) Apical abdominal segment of male of *T. emmae* nov.sp., (7) distribution of *T. emmae* nov.sp. in Northern Australia (black squares).



Figs 8-13: Habitats of *T. emmae* nov.sp. (8) Bowerbird Creek at Kakadu Highway, NT, (9) Harriet Creek, NT, (10) rest pools of Piccaninny Creek (loc. 29a/129a), WA, (11) slow flowing creek in Barnett Gorge (loc. 17/117), WA, (12) Russ Creek (Loc. 8/108), WA, (13) Nameless creek 40 km W Kununurra (loc. 30/130), WA.